Small Business Innovation Research/Small Business Tech Transfer

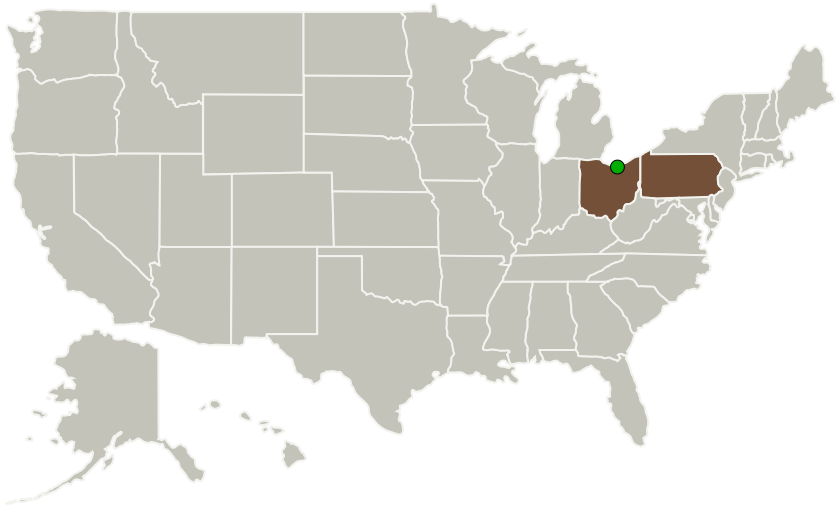
Low Cost Radiator for Fission Power Thermal Control, Phase II

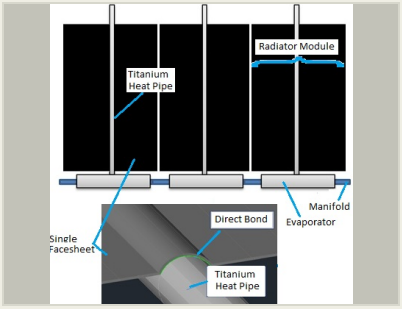
Completed Technology Project (2014 - 2016)

Project Introduction

NASA GRC is developing fission power system technology for future space transportation and surface power applications. The early systems are envisioned in the 10 to 100kWe range and have an anticipated design life of 8 to 15 years with no maintenance. A non-nuclear system ground test in thermal-vacuum is planned by NASA GRC to validate technologies required to transfer reactor heat, convert the heat into electricity, reject waste heat, process the electrical output, and demonstrate overall system performance. This SBIR project by ACT will develop a modular single-facesheet Variable Conductance Heat Pipe (VCHP) radiator, operating near 450K, to support the Technology Demonstration Unit (TDU) for surface power. Based on the Phase I results and the experience gained during previous NASA SBIR VCHP radiator programs, ACT and VST will develop in Phase II a low cost high specific power modular radiator for the TDU. New features of this radiator include direct bonding to the titanium condenser and the fact that it is modular and therefore, the CTE mismatch on the manifold direction is eliminated. The modular radiator will consist of 12 clusters of 9 modules each. ACT will design the modular radiator, validate the radiator module, fabricate the heat pipes and test the clusters in ambient conditions before sending them to GRC. VST will further develop the GFRC direct bonding and attach the GFRC fins to all the heat pipes.

Primary U.S. Work Locations and Key Partners





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Completed Technology Project (2014 - 2016)

Organizations Performing Work	Role	Type	Location
Advanced Cooling Technologies, Inc.	Lead Organization	Industry	Lancaster, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Transitions

April 2014: Project Start

April 2016: Closed out

Closeout Summary: Low Cost Radiator for Fission Power Thermal Control, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/137468)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Advanced Cooling Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Calin Tarau

Co-Investigator:

Calin Tarau

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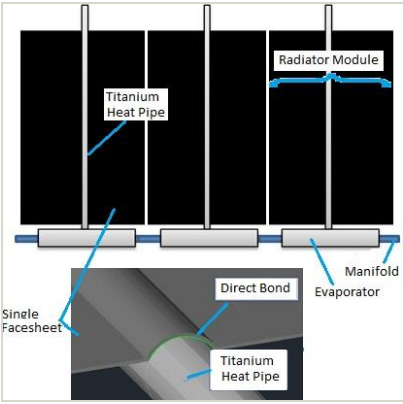
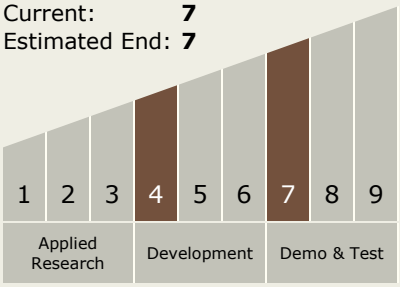
Images



Briefing Chart Image
Low Cost Radiator for Fission Power Thermal Control, Phase II
(https://techport.nasa.gov/image/133227)

Technology Maturity (TRL)

Start: **4**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.3 Heat Rejection and Storage

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System